DEPARTMENT OF THE AIR FORCE

HEADQUARTERS UNITED STATES AIR FORCE

WASHINGTON, DC

18 July 2001

MEMORANDUM FOR HQ FAA/AGC-1/AVR-1

FROM: HQ AFFSA/CC
1535 Command Drive, Suite D309
Andrews AFB, MD 20762-7002

SUBJECT: Title 14 Code of Federal Regulations Part 91.209 Exemption Request

Due to evolving operational demands, the United States Air Force requests an exemption from Title 14 Code of Federal Regulations (14 CFR) Part 91 Section 209, *Aircraft Lights*, (a) (1) and (b) to conduct lights-out operations in specific Military Operations Areas (MOA). This request is made to support a vital training requirement to increase current levels of lights-out Night Vision Goggle (NVG) training in low and medium altitude airspace. Experience validates this requirement. Our success in Kosovo must be tempered with the challenges our pilots were forced to overcome. Across the mission spectrum, inexperience in lights-out operations was common. Many pilots flew their first lights-out NVG sortie during their initial combat missions. With advances in foreign technologies and increased proliferation trends, we anticipate greater resistance during night air missions and must be prepared to meet these threats. By conducting lights-out training prior to actual combat, pilots have an opportunity to achieve the confidence, proficiency and situational awareness needed to be successful in combat. We need a solution that permits this vital training to occur within accessible airspace so AF pilots can "train as they fight." As a military service and a nation, we must ensure our forces train safely and wisely, but in an operationally relevant environment.

Why must our combat air forces train lights-out? One issue is lighting itself. Due to incompatibility between external aircraft lighting and NVG technology, a vast majority of NVG training must be conducted with reduced or extinguished external lighting. Current Federal and USAF regulations permit reduced, or lights-out training in restricted and warning areas. However, restricted airspace for this is either inaccessible to most units or limited due to competing demands. There are a number of factors that limit access to designated special use airspace (SUA): flying units' geographic separation from SUA; flying time to and from SUA that exceeds aircraft fuel capacity; airspace conflicts; and weather. The relatively small size of many restricted areas makes them unusable for significant NVG training. Coastal warning areas, while larger in size, provide limited returns due to a lack of terrain relief and horizon. The limited lack of return from these coastal warning areas is related to NVGs requirement for reflected energy in order to function. Terrain is of great importance when employing with NVGs, in that terrain reflects energy. That reflected energy creates what is called "albedo" when it interacts with terrain. Albedo is the comparison of reflective properties of different objects within a particular scene. The different reflective properties of various objects create contrast and detail within the scene. Therefore, the more varied the terrain, the more albedo differences within a scene, thus creating a more accurate image for the NVGs. The lack of albedo in many of these overwater SUA areas, especially warning areas, seriously impacts the overall effectiveness of NVG operations. Similarly, a lack of terrain also lends itself to a lack of horizon, which in any flying environment is always more challenging and potentially hazardous. Lastly, our experience has shown that we can expect the air battle to take

place over varied terrain, whether mountainous or desert, and our crews must train in these types of realistic environments.

With the above in mind, the USAF is requesting relief from 14 CFR Part 91 Section 209 to conduct NVG lights-out training in the Alaskan military operating areas, and selected MOAs within the lower-48 contiguous United States and Puerto Rico (Attachment 1). This request applies to USAF active duty, Air National Guard and AF Reserve aircrew. Application of the proposed exemption to lights-out NVG training in selected MOAs, within the lower-48 contiguous United States, Alaska and Puerto Rico will adhere to the following restrictions:

a) Operations under this exemption will be conducted within MOAs published in DoD FLIP, AP/1A, FAA Order 7400.8 and in accordance with "times of use" criteria.

b) All operations will be conducted under the procedural requirements of a Letter of Agreement (LOA) between the USAF (flying unit) and the Air Traffic Controlling Agency having jurisdiction over the MOA. The LOA must include the following provisions:

   1) The geographical boundaries, altitude restrictions, and name of the MOA in which operations under this exemption are authorized.

   2) Reasons and procedures to immediately terminate lights-out/covert lighting configurations and return aircraft external lighting to normal configuration IAW 14 CFR Part 91 Section 209 and USAF instructions.

   3) Lost communication procedures.

   4) Loss of radar contact procedures (when applicable).

   5) Establish non-radar procedures when not in a radar environment.

   6) The type aircraft and USAF units authorized to conduct NVG operations under this exemption.

   7) Notification procedures to advise the controlling Air Traffic Facility on activation and termination of lights-out activities.

c) As part of a unit's midair collision avoidance (MACA) program, unit safety offices, with coordination from unit tactics and training offices, will ensure all airfields and other flying operations within a 50-mile radius of a selected MOA used for lights-out training are thoroughly briefed on all aspects of the operation. Units sharing the use of selected MOAs for lights-out training may combine their efforts.

d) A NOTAM will be issued 24 hours prior to any operations under this exemption. Additionally, a message will be placed on the unit’s local automatic terminal information service (ATIS), advising listeners of the time and place of lights-out operations.

e) Aircraft equipped with onboard sensors will clear training airspace prior to initiating lights-out operations. MRU/ RAPCON controllers, when available, will monitor the MOA boundaries and immediately advise all participants when a non-participating aircraft has

entered. In either case, if a non-participating aircraft enters the airspace all participants will immediately restrict their operations as necessary to ensure the safety of the non-participant.

f) Units will ensure the airspace manager of a particular MOA to be used for lights-out training submits a publication change to VFR sectional charts posting an advisory to non-participating aircraft which states the potential for lights-out operations in the MOA. Additionally, the advisory will recommend checking NOTAMS and contacting local FSS to determine whether or not the MOA is scheduled or active with lights-out training.

IAW (14 CFR) Part 11, the following justifications are also submitted for FAA consideration:

a) *Why is this exemption in the public interest*? The AF mission is to defend the United States through the control and exploitation of air and space. Relevant, agile technologies that preserve a clear military advantage are the keys to deterrence, readiness, and USAF mission accomplishment. NVGs are an example of these technologies and, to be used effectively in conflict, they must be used realistically in training. Advances in night vision technology will likely migrate into civilian aviation and lead to safer night, VFR operations for both the general and commercial aviation community.

b) What is the equivalent level of safety? In designated MOAs, the equivalent level of safety is provided through a variety of conditions that when executed in concert will increase the level of safety for all NAS users.

1) The following measures will ensure that non-participating aircraft are provided with preflight and en route notification of lights out activities:

- A NOTAM will be issued 24 hours prior to all lights-out operations ensuring that during the course of flight planning all NAS users will be provided information on the time and place of lights-out operations in selected MOAs.
- Advisories posted on VFR Sectional Charts with lights-out operations information and reminders to check with the appropriate FSS for NOTAMs should enhance the awareness of non-participants with regards to where and when lights-out operations may be expected.
- Providing informational briefs to local flying organizations will increase lights-out operations awareness and facilitate effective communications between AF units and local airfields or flying operations.
- Local ATIS advisories will provide additional notification of lights-out activities to transient aircraft .

2) The following provisions will ensure that non-participating aircraft are afforded the opportunity to see and avoid participating aircraft at distances greater than those currently required by Federal Aviation Regulations:

- For those aircraft equipped with onboard radar, sweeping the area with these radar systems will ensure that no non-participating aircraft are within the MOA boundaries prior to commencement of NVG operations and will provide warning of any aircraft approaching the MOA. On detection of a non-participating aircraft, participants will immediately restrict NVG operations.

- The use of ground radars (MRU/RAPCON) will provide an additional measure of detecting non-participating aircraft. Again, lights-out operations will be immediately restricted when a non-participating aircraft enters the MOA.
- Notifying Air Traffic Control facilities on activation and termination of lights-out operations will ensure that ATC is aware of the activities in the MOA and enables the controller to de-conflict the surrounding airspace.

In addition to ensuring that the rights of non-participating aircraft are protected, the inherent advantages of NVG technology (as outlined below) will exponentially increase the distances at which a pilot equipped with NVGs can detect a conventionally lit aircraft. This increase in visual detection range combined with the resultant effect of the above measures will ensure that lights-out activities are halted well before non-participating aircraft would normally visually acquire a conventionally lit aircraft.

NVG technology affords an unequivocal visual advantage versus normal night sight, so much so that aircraft with conventional external lighting will be visible at extended ranges depending upon conditions. Night vision goggle capabilities, coupled with on-board systems, optimize situational awareness provided to today's combat pilots. This far exceeds the visual assumptions under which 14 CFR Part 91 Section 113, *See and Avoid*, is currently structured. Moreover, the use of NVGs greatly enhances not only the situational awareness of the individual using the devices, but increases the overall safety of all aircraft (to include non-participating aircraft) in the area of NVG usage. This is due to the nature of the human eye. Night VFR flights without NVGs forces the pilot of an aircraft to use Scotopic (night) Vision. Typical unaided Scotopic vision ranges from 20/200 to 20/400. When comparing unaided Scotopic vision with the minimum Air Force NVG standard of 20/40 (20/25 is normal resolution), the individual using NVGs can see 5-10 times more clearly than an individual who is flying an aircraft using unaided vision at night. Putting Scotopic vision into perspective means that an individual would have difficulty visually identifying the largest block letter on an eye chart (20/200) from a distance of even 20 feet. Unaided night vision also causes a lack of color discrimination and there is a night blind spot created by the lack of rod cells in the fovea that is in addition to the blind spot created by the optic nerve. Summarizing these facts, NVGs significantly increase (5-10 fold) the level of night VFR safety associated with not only the individual users of the devices, but to all participants and non-participants within the view of anyone equipped with NVGs. Additionally, NVGs increase a pilot's "outside the cockpit" visual scan rate. The increased visual cues associated with NVG usage maximize situational awareness while enhancing navigation, maneuverability, multi-ship operations, and the ability to detect aircraft with non-compatible Night Vision Imaging System (NVIS) exterior lighting. Of significance here is detection. The sensitivity of NVGs allows detection of aircraft with non-compatible exterior lighting at vastly greater distances than during day VFR flight. This sensitivity is due in part to the inherent characteristics of NVGs responding to a greater range of available energy, harnessing that available energy, and then intensifying it.

c) *Will MOA access be lost?* This exemption will not in any way change the overall usage of MOAs by the Air Force or limit access to these MOAs. The Air Force wants to ensure that any question regarding access to MOAs is addressed using accurate information. The average total number of sorties flown per 24 hour period is projected to remain the same. Of that total number, approximately one third will be night sorties and only a proportion of that amount are projected to be lights-out. What this bears out is that night sortie occurrence is limited in scope to the overall usage of MOAs in general and will not limit any constituency access to MOAs

now, or in the foreseeable future. Additionally, per the reasons stated above, we believe that access to MOAs will be with a greater margin of safety than we now currently have.

All users, FAA, DoD, and General Aviation, share the responsibility of safety in the NAS. The Air Force shares this concern and remains confident through cooperation and risk management a successful resolution for all can be reached. This exemption has a far-reaching impact on our ability to train effectively in our nation's defense and will enhance our capabilities, ensuring the Air Force remains on the leading edge of combat aerospace power. Thank you for consideration of this petition based on the merits of safety, standards, and precedent. Please direct comments to Capt Mark Wuennenberg, HQ AFFSA/XOF, (204) 857-5416.

//signed//
RICHARD P. PACKARD, Colonel, USAF
Commander

ATTACHMENT 1

MOA

Airburst A, B, & C
Avon E, N, S
Bagdad
Basinger
Beaver
Birch
Bison
Brownwood (All)
Bronco 1/2/3/4
Bruneau1/2
Brush Creek
Buckeye
Buffalo
Bulldog A, B, D
Camden Ridge
Cato
Chippewa
Cheyenne
Condor 1 & 2
Crypt N, Cen & S
Desert
DeSoto 1 & 2
Devils Lake E/W
Duke
Eielson
Eureka Hi & Lo
Falcon 1 & 3
Falls 1 & 2
Farmville
Fox 1,2, 3
Galena
Gamecock A, C, D, I
Gandy
Gladden
Goose
Hart N/S
Hays
Hill Top
Hog N/S Hi & Lo
Howard East/West
Jackal
Jackal Low

MOA

*Jarbidge (Proposed)
Juniper Lo & N/S
Kingsville 1,2,3,4, & 5
Kiowa
Lake Andes
Lake Placid
Lindbergh
Lucin A/B/C
Marian
Moody - 1, 2, N&S, 3
Morenci
Naknek
Olympic
O'Neill
Outlaw
Owyhee
Palatka 1 & 2
Paradise
Pecos
Pike E & W
Pine Hill
Powder River A & B
Red Hills
Reserve
Reveille
Rose Hill
Saddle A & B
Salem
Saylor
Sells 1 & Low
Sevier A/B/C/D
Seymour Johnson (Echo)
Sheep Creek 1/2/3
Smoky
Smoky High
Snoopy - West
Steelhead

Stony A & B
Sustina
Syracuse 1, 2, 3, 4
Taiban
Talon
Tiger N/S
Tombstone A, B, C
Truman A, B, C
Twelve Mile East/West
Volk - East, West, South
Warrior 1, 2, 3 (Hi/Low)
Yankee 1 & 2
Yukon

*Jarbidge will combine all of Bruneau, Sheep Creek and Saylor MOAs.